

The Examiner rejected claims 1-48 under 35 U.S.C. 112, first paragraph. The Examiner stated that "it is not clear for guided-wave laser and Er-doped crystalline laser. Is this the guide wave laser or fiber optics or just wave-guide? This is not a laser. In the specification, the applicant does not provide any laser. The disclosure is confusing and misleading because a wave-guide laser is a wave guide and Er-doped is crystal or medium. It is not a generic term to use 'guide-wave laser' and 'Er-doped solid-state crystal laser'".

Applicants respectfully traverse.

Applicant's description of the claimed Er:YAG laser in the specification. The core of this description is found between p. 14 line 19 and p. 16 line 19, and further details are found throughout the specification. As shown in Figure 1, a guided-wave laser (104) pumps a bulk Er-doped crystalline laser (106). Both are lasers. The Er-doped crystalline laser (106) is the output laser, and the guided-wave laser (104) is the pump laser for (106). Claim 1, element (c) claims "coupling the guided-wave laser output emission to upper-state pump the Er-doped solid-state crystal laser device, wherein the guide-wave laser output emission stimulates the solid-state crystal laser device to produce the laser radiation...". Applicants specification, p. 9 line 14 supports this claim with the statement: "1.6-micron Er-doped bulk crystal laser by pumping the Er-doped laser with a 1.533-micron guided-wave laser such as the Yb,Er-doped fiber laser." Therefore, both lasers are described in the specification in such full and complete details as to allow one skilled in the laser art to make and use the claimed invention.

The Examiner rejected claims 1-4, 1 and 25-28 under 34 U.S.C. 102(c) as being unpatentable over Scheps, U.S. Patent No. 6,404,785.

Applicants respectfully traverse.

The standard for anticipation under 35 U.S.C. 102 is one of strict identity. To anticipate a claim for a patent under 35 U.S.C. 102, a single prior art reference must disclose all elements of the patent claim under consideration. As stated in In re Bond, 15 USPQ2d 1566, 1567 (Fed. Cir. 1990), "For a prior art reference to anticipate in terms of 35 U.S.C. §102, every element of the claimed invention must be identically shown in a single reference." (quoting Diversitech Corp. v. Century Steps, Inc., 7 USPQ2d 1315, 1317 (Fed. Cir. 1988)). Multiple references cannot be combined to create an anticipation; all elements of the claim must be disclosed in a single reference. Continental Can Co. USA Inc. v. Monsanto Co., 20 USPQ2d 1746, 1748 (Fed. Cir. 1991) ("When more than one reference is required to establish unpatentability of the claimed invention anticipation under § 102 can not be found . . ."). Further, the prior art reference must be enabling. Constant v. Advanced Micro-Devices Inc., 7 USPQ2d 1057, 1063 (Fed. Cir. 1988), cert. denied, 488 U.S. 892 (1988) ("A printed publication must also be enabling." citing In re Donohue, 226 USPQ 619, 621 (Fed. Cir. 1985)). "Anticipation requires the presence in a single prior art disclosure of all the elements of a claimed invention arranged as in the claim." Connell v. Sears, Roebuck & Co., 220 USPQ 193, 198 (Fed. Cir. 1983) (citing Soundsciber Corp. v. U.S., 148 USPQ 298, 301 (Cl. Cl. 1966)). Similarly, in Atlas Power Company v. E.I. duPont De Nemours and Company, 224 USPQ 409, 411 (CAFC 1984), the court held: "Exclusion of a claimed element from a prior art reference is enough to negate anticipation by that reference."

The examiner has miss-identified some of the components of Scheps. First, (204) is not a waveguide (i.e. guided-wave) *laser*, instead (204) is an optical fiber. See Col 4, line 4, wherein Scheps states "laser diode 102 is *coupled* to waveguide upconversion laser 112 by an *optical fiber* 204" (emphasis added). An optical fiber is a passive waveguide, not a laser. Further, the act of *coupling* means the light is not being changed, thus the optical fiber 204 cannot be a laser.

① ② ③
The waveguide (204) only serves to passively transmit the laser diode power (104) to the waveguide laser (112). Second, (114) is not pumped by a waveguide laser. Instead, (114) is the waveguide laser itself. More particularly, (114) is the waveguide region, and (112) is the waveguide laser.

① ② ③
Scheps discloses a wave-guide laser pumping a sum frequency generator (120), (see column 3, lines 15-20, and column 4, lines 5-10). A sum frequency generator is not a laser since it does not utilize amplified stimulated emission, but is a non-linear optic device that converts input radiation of two given wavelengths into output radiation of a different wavelength. In contrast, the present invention claims 1 and 25 claim a guided-wave laser that pumps a solid-state crystal laser device. The operation of the crystal laser device is completely different from a non-linear optic frequency conversion device. In the present invention the guided-wave laser is the power source that produces stimulated emission in the solid-state crystal laser device, whereas in the Scheps non-linear conversion device there is no stimulated emission, but instead a non-linear conversion process. Thus, Scheps fails to disclose or suggest applicants claimed invention, comprising three lasers in series, as claimed in claims 1-4, and 25-28.

The Examiner rejected claims 16-24, 26-28 and 40-48 under 34 U.S.C. 103(a) as being unpatentable over Scheps, U.S. Patent No. 6,404,785 in view of Muller, et al., U.S. Patent No. 5,963,575.

Applicants respectfully traverse.

As discussed above, Scheps discloses a wave-guide laser pumping a sum frequency generator (120), (see column 3, lines 15-20, and column 4, lines 5-10). Thus, Scheps fails to disclose or suggest applicants claimed invention, comprising three lasers in series, as claimed in claims 16-17 and 40-48.

② 8
Scheps does not disclose a Q-switch for the Er-doped crystal laser, because in Scheps the Er-doped crystal laser is a waveguide laser (112). The waveguide laser geometry is not compatible with insertion of a Q-switch in the laser resonator, because of the integrated, monolithic nature of the waveguide geometry. Therefore, Scheps cannot be modified to Q-switch the waveguide laser, because a waveguide laser is not compatible with insertion of a Q-switch. Applicant's disclosure, on the other hand, discloses a waveguide laser, which cannot be Q-switched, that pumps a bulk crystal laser, which can be Q-switched.

The pump source for the Muller patent is a flash lamp (column 3, lines 1-4). In a flash lamp pumped laser, a multiplicity of energy states is pumped owing to the broad range of pumping wavelengths (several hundred nm) emitted by the flash lamp. In particular, while the flash lamp emission wavelengths extend over several hundred nm, a single energy state extends over only a few tens of nm.

⑤ ⑦
In the present invention the pump source is a guided-wave laser (claim 1b) that emits a narrow range of wavelengths (approximately 1 nm). Claim 1(c) claims an upper-state pumped Er-doped laser, that is, a single energy state in the Er-doped crystal is pumped by the guided-wave laser. A flash lamp (Muller column 3, lines 1-4) can not upper-state pump the Er-doped crystal laser, because the flash lamp pumps a multiplicity of energy states. That is, the flash lamp emission spans a broad band of wavelengths, and with that broad band of wavelengths are particular wavelengths which pump different states. This causes problems because the multiplicity of excited states that are pumped by the flash lamp interact with each other to produce loss in a variety of ways, such as fluorescence loss, multiphonon decay loss, cross-relaxation loss, and upconversion loss. In the present invention, on the other hand, only the

upper laser state (the first excited state) is pumped, and the laser action proceeds directly from this state without any possibility of the detrimental interactions described above.

The Examiner rejected claims 5-15 and 29-39 under 35 U.S.C. 103(a) as being unpatentable over Scheps in view of Muller, et al. and further in view of Anthon, U.S. Patent 5,644,589.

Applicants respectfully traverse.

As discussed above, Scheps and Muller do not disclose or suggest the claims upon which claims 5-15 and 29-39 depend. Further, Anton discusses an Yb,Er-doped waveguide laser operating in the 800 nm to 1100 nm wavelength range. It is not obvious from a device operating at these wavelengths how to operate an Yb,Er-doped waveguide laser in the 1450 nm to 1540 nm wavelength range, because emission in the 800 nm to 1100 nm wavelength range results from operation on a different transition between energy states than emission in the 1450 nm to 1540 nm wavelength range. Operation of lasers on different transitions between energy states represent completely different lasers, with many differences in appropriate pumping method and relevant energy transfer mechanisms. Therefore, claims 5-15 and 29-39 are not anticipated by the combination of Scheps, Muller, and Anthon.

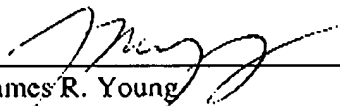
Applicants have made a diligent effort to place the claims in condition for allowance.

However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone James R. Young, Applicants' Attorney at 512-869-2606 so that such issues may be resolved as expeditiously as possible.

For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,

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Date


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